

GEOLOGY IN THE MEDFORD AREA, OREGON

By  
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This paper is a review of the geology of part of southwestern Oregon as worked out and mapped by Diller, Winchell, Wells, and Wilkinson.\*\* The area described is of special interest because it affords an opportunity to observe the seldom exposed "basement" rocks of the Cascade Range.

The geologic column of this area includes possible Proterozoic, Paleozoic, Mesozoic, and Cenozoic rocks. The Cenozoic rocks are represented in the rocks of the western Cascades and in the sediments and volcanics of Bear Creek and Rogue River valleys. The Mesozoic rocks occur along the southwestern edge of Bear Creek Valley and in isolated spots on the adjacent foothills. The oldest rocks are to the south and west of Medford in the Klamath geomorphic province, and they, in this area, are called the Siskiyou Mountains.

Old schists are found near the California line almost due south of Medford. These schists undoubtedly are some of the oldest rocks in Oregon, although there is no definite paleontological evidence to prove this. They consist of highly altered, crenulated and folded rocks, the most abundant of which are plagioclase-hornblende schists. Sericite and graphitic schists are also common. The plagioclase-hornblende schists are interpreted as highly altered andesite or basalt flows, the sericite schists as altered dacite or rhyolite, and the graphitic schists as altered organic sedimentary rocks. The age of these rocks is Paleozoic or older, and their character indicates both volcanism in Oregon in earliest times and the existence of ancient seas.

Lying unconformably on these rocks is a series of altered volcanic and interbedded sedimentary rocks. Although these rocks are badly altered, the advanced stage of metamorphism present in the old schists is not reached. These rocks are mainly metavolcanics and probably represent former basaltic and andesitic types. Pillow structure and vesicular and porphyritic textures are common. The meta-sedimentary rocks occur interbedded with the metavolcanics and are lens-shaped - varying from a few yards to several tens of yards across and from a few yards to as much as ten to twenty miles long. They consist of argillites, quartzites, and limestones (some of the limestones could now be called marbles). It is from the latter type of rock that the only fossils have been found. A Paleozoic age (from Devonian to Carboniferous) was first indicated by these fossils, but recent collections cast doubt upon this interpretation. An age as recent as Triassic may be assigned to them. However, a thorough examination of the fauna will be necessary before a definite age can be given. Triassic

A group of rocks between the old schists and metavolcanic rocks in degree of metamorphism is represented by contact aureoles around the intrusive masses. These rocks were called the "May Creek schists" by Diller, in the Riddle quadrangle, and the "younger metamorphics" by Wells in the Medford quadrangle. In the Grants Pass quadrangle Wells was able to trace the highly altered facies of the contact zone directly to the less altered metavolcanic and metasedimentary rocks, therefore this intermediate group is considered as part of the metavolcanic-metasedimentary group of rocks.

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\*\*Bibliography at end of this article.

The enormous quantity of altered lavas in the metavolcanic group indicates another great period of volcanism in the geologic history of southern Oregon. The presence of metasedimentary rocks plus the pillow structure and the calcareous interlayers in many of the metavolcanics indicates deposition in seas.

All the above rocks are intruded by igneous masses ranging from ultrabasic to acidic. From the frequency of the outcrops it is thought that most of the area is underlain at a shallow depth by "granitic" intrusives. Comparing these intrusives with the intrusive sequence in California the peridotites are believed to be the earliest bodies emplaced. These were followed by basic dikes and "granitics" ranging from gabbro to true granite and were intruded in that order. The greatest quantity is granodiorite and diorite. The last phase of intrusion is marked by the aplite and pegmatite dikes. The age of intrusion is from late Jurassic to early Cretaceous.

Most of the mineral deposits of the region owe their origin to this period of intrusion. Chromite is a segregation in the ultrabasic masses, copper mineralization accompanied the basic intrusives, and the gold and silver mineralization accompanied the veins and dikes.

At the northeastern edge of the Siskiyou Mountains in this area and bordering Bear Creek valley to the southwest are spotty occurrences of Cretaceous sedimentary rocks which are referred to the ~~Chico~~ <sup>HORN BROOK fm</sup> series (upper Cretaceous). Their contact with the older underlying rocks is unconformable. The rocks are mainly sandstones and shales with occasional coarse conglomerate lenses at the base. The conglomerates contain many pebbles from the older formations and are occasionally auriferous. The Cretaceous rocks strike northwesterly and dip at low angles to the northeast, that is, under the Western Cascade volcanics. In many places the sandstones are quite fossiliferous.

Stratigraphically above the Chico is the Umpqua formation. This formation is considered to be of the middle Eocene epoch. Although the Umpqua has a marine fauna elsewhere, most of the fossils found in the Medford area are vegetable remains. It is thought that this indicates deposition in fresh water and that if there was a connection with the Umpqua seas to the north it must have been very narrow and shallow. Many good fossil leaf localities for the Umpqua formation are known in this area.

The Umpqua lies beneath all of Bear Creek valley and extends to the headwaters of the east branch of Evans Creek (about 20 miles northwest of Medford). Like the Chico, its contact with the metavolcanics is unconformable. Sandstones predominate in this formation. The strike of the formation in Bear Creek valley is to the northwest and it has very gentle dips to the northeast. It disappears under the western Cascades on the northeast side of Bear Creek valley.

At the northeast edge of Bear Creek valley (just north of Medford) the Umpqua grades into water-laid volcanics or agglomerates of the Western Cascade volcanics. To the southeast (near the headwaters of Bear Creek) the contact with the volcanics is disconformable, indicating uplift near the California line.

The Western Cascade volcanics, the formations on which the higher peaks of the Cascades such as Mt. McLoughlin and former Mt. Mazama rest, are composed of agglomerates, tuffs, breccias, and associated lava flows. They range in age from at least lower Oligocene or upper Eocene through Miocene. These volcanic rocks are separated by at least two and possibly three unconformities. The dip to the northeast is probably due, at least in part, to diastrophic movements in upper Miocene time.

The upper parts of the valleys of the Rogue River and Little Butte Creek are partially filled with flows of high olivene basalts. These are early lavas of the High Cascades.

Near the junction of Bear Creek with the Rogue River are two flat-topped buttes called Upper and Lower Table Mountains. The flat tops are lava cappings covering Umpqua sandstone. The lava cappings are remnants of more extensive flows and are probably late Tertiary or Quaternary in age.

Along the northeast side of Bear Creek valley are several intrusive masses of diorite and basalt which cut the Umpqua formation and, in the headwaters of Little Butte Creek, are intrusive into at least the lower members of the volcanics of the Western Cascades.

A "rock-hound" or amateur paleontologist visiting the Medford area will find the best collecting grounds in the following places:

Invertebrates - in the Chico sandstone along the southwest side of Bear Creek valley.

Vertebrates - in the placer mining areas. (A few larger bones and tusks have been found in placering but this area is far from being a collector's paradise. If specimens are found, be sure to preserve them immediately.)

Plants - around the "coal measures" in the Umpqua formation on the northeast side of Bear Creek valley and in the volcanic tuffs and agglomerates of the volcanics of the Western Cascades.

Agates - in the Agate Desert just north of Medford. However, this area was pretty thoroughly scoured during the war (it was the site of Camp White) and is not as prolific as it once was. The next best spots are in the stream beds below the green-colored agglomerates north and northeast of Medford. Nice geodes can often be found in the agglomerates near the mouth and along Antelope Creek.

For those who wish to pan for gold, the streams draining the area of the metavolcanics are suggested. And for the more hardy souls who wish to do hard-rock prospecting, the areas adjacent to the intrusive masses are recommended.

For those who wish to fish or just "sight-see" there are many very nice State and National Forest Service roadside camping sites along the Rogue and Applegate Rivers. These, as is well known, are equipped with tables and benches, running water, fireplaces, firewood, and comfort stations.

#### Bibliography

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